1955-5
IX-3
doc. 468

UNITED STATES
DEPARTMENT OF THE INTERIOR

DI-6

APPROVED DECEMBER 1941

1955 - NTBA 5, Inyan Kara study #3

K.M. Waage

Contents.

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In Denver - Mrs Henry Bell - Photostatic map
or June Peterman (now married) -
+ for Robbins Sections.
OK to take them back +
reproduce

Flying U Ranch
[illegible]

Edgemont area with Garland. Gott (cont. from p 56, Ntbk 4, I-K 2)

has traced channel edge; it has a northwest trend. Sandstone is fine to medium grained.

Base Fall River seen at E, F ~~and G~~ similar to that in Devils tower area. Garland puts local channel sand directly under what I call base, in Fall River. This in same position as Henry Bells "Gould" ss. — will call it "Fuson sandst." here, it would be top Lakota, one ore-bearing in Carlile mine probably, in D.T. area.

Fall River — Fuson-Lakota contact.

Seen at E (picture) where it resembles the "red, white, & blue" contact of D.T. area. At some of road cuts we crossed zonation also evident, this was in Robinson Flats area. The Fe specks were present. At E the contact was within 2 or 3 feet of basal FR ss and a thin ss bed was on it locally.

Where the "Fuson sandstone" was present at F and H we discussed its position relative to the Fall River. At F there is no weathered zone and Fall River sits directly on the "Fuson ss".

1

Garlands interpretation is that this is a channel sand originating in the basal Fall River, whereas I interp. as a "Fuson", or post-Fuson sand truncated by Fall River plane of contact. At F the top surface is plane, but neither interp. can be eliminated. At H, however, the "Fuson ss" is still present but not completely occupying "Fuson" interval, and we found the weathered zone with red claystone beneath it resting on "Fuson" ss. I think this relationship favors my interp. esper. since Garland has mapped the ss in detail & shown it to be same as at F.

Suspect that the "contact" of Fall River & Fuson-Lakota will be found to hold in the southern Hills, but that it may be complicated to find locally because of Fall River (in my sense) channeling and more widespread presence of the "Fuson ss"

Saw contact in Henry Bell's Flint Hill quad. but had difficulty with it where his "Gould" ss was present. Here the grey

Fall River sh + thin interc. ss set right on x-bedded to massive x-lam "Gould" with top "Gould" loc. Fe impreg. - but about a mile away found good red white + blue zone where "Gould" didn't come up as high in section.

"Fuson ss." - This lenticular unit locally distributed, is locally ore-bearing. It is the only unit in what I would call their Lakota (= Fuson + Lak) which has coarse to cgltic ss similar to that in D.T. area. The basal cgl of this unit at locality H has an excellent basal cgl made up of frags + chunks + rounded pebbles of underlying beds (ss + clstn), chert + qtzt. granules and a few polished pebbles. Also found some polished pebbles in float from red clstns above the ss at locality H.

"Fuson". This would be from Fall River contact - which Gazland puts same place I would except where "Fuson ss"

See dr. 11/5

JURASSIC PARKING

Y.P.S.

occurs to the Minnewaste, which is locally present in Edgemont NE. Saw it at G, where it is sandy, and again at place to W off map where it was more typical. Where no Minnewaste Fuson bottoms on first "white massive" sandstone. At G the Fuson chiefly claystone had big silic. tree trunk, foss. wood all over. Saw several polished pebbles in float, colored clsts as in D.T. area and some of those thin white sugary sands also common in D.T. area.

Lakota. In Garlands quad the Lakota can be subdivided with rather good consistancy to its parts, but this doesn't apply outside this quad.

At top are massive white ss. Locally 2 beds, below this a lacustrine section of even-bedded ss, clsts, sh & some very limy beds. The clsts have ostracods & charophytes. (Loc. B - picture) Below this is thick ss., fine or massive brown weath commonly

broken by bench in middle, looks like the massive Fall River sands. It is ss most of Indian pictographs are on.

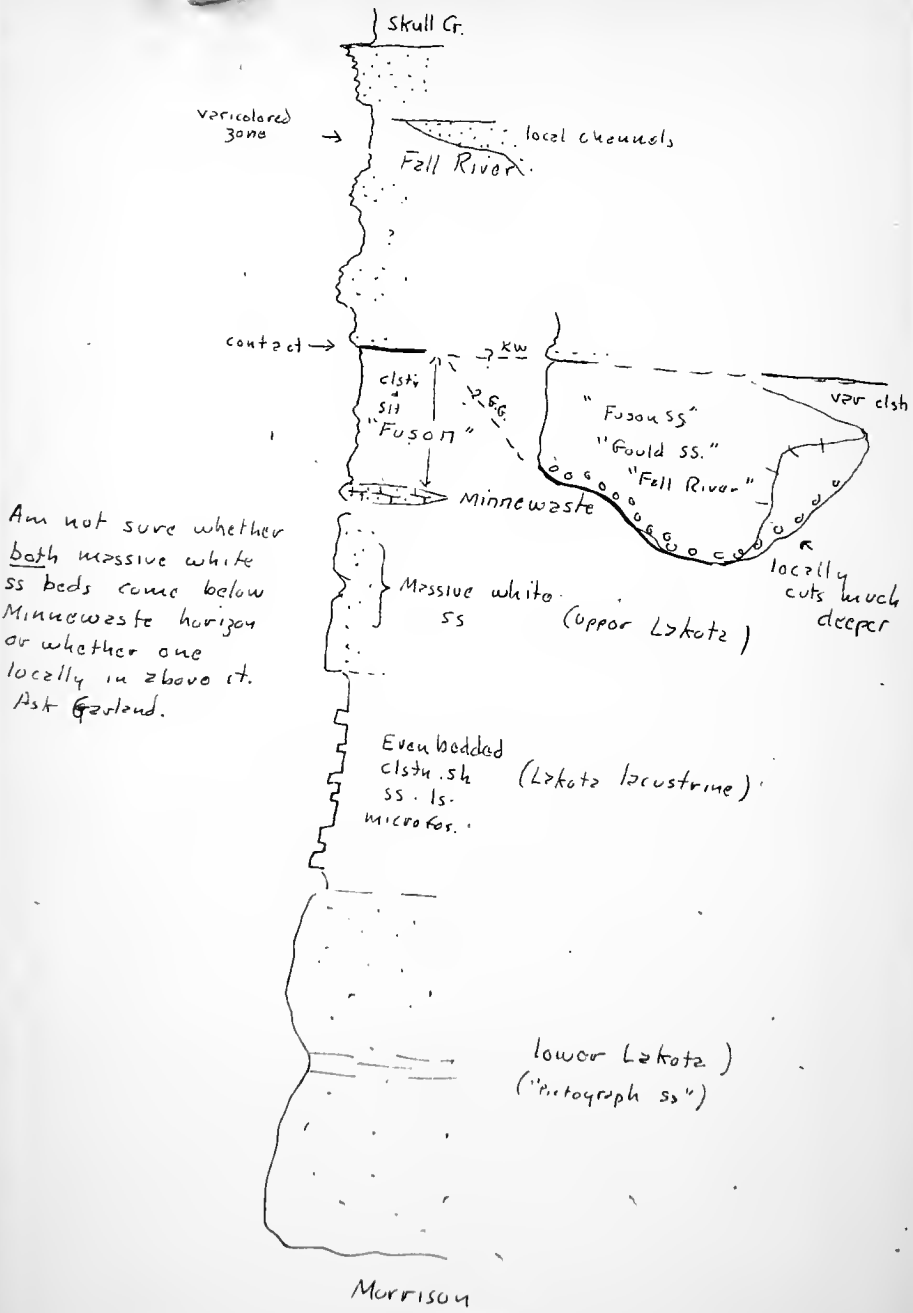
As I understand it "Fuson ss" is additional to these locally.

Lakota - Morrison contact.

Definitely 2 kinds. At C. basal massive brn. Lakota sits on green Morrison clstn section. At K Black shale with carb fragg & some silty lam are in sharp contact with green Morrison clstns below.

Morrison can't be much over 40-60 ft at K but G. says most places over 100 ft.

Generalized section — Best rep. section of Fairlands area is in single face at loc. I on map. This goes from base Lakota into lower Fall River ss. Could prob. get full Fall River incl. Stull Cr. contact in lower Red Canyon near A. In Flint Hill quad. Lakota differs tho lacustrine


Skull Cr.
varicolored zone
local channels
Fall River
contact
Kw
clsty ss
"Fuson"
"Fuson ss"
"Gould ss."
"Fall River"
var clsh
Minnewaste
Massive white ss (Upper Lakota)
locally cuts much deeper
Am not sure whether both massive white ss beds come below Minnewaste horizon or whether one locally in above it. Ask Garland.
Even bedded clsty. sh ss. ls. microfos. (Lakota lacustrine)
lower Lakota ("Pictograph ss")
Morrison

beds loc. present. Bell has sent Charophytes + ostracods to Peck. OK'd for Lower Cret. He, Bell has also had fossils in polished pebbles studied by P+S + report says Pennsylvanian - could be Minnekahta or correlative units in Bighorns or Hartville uplift.

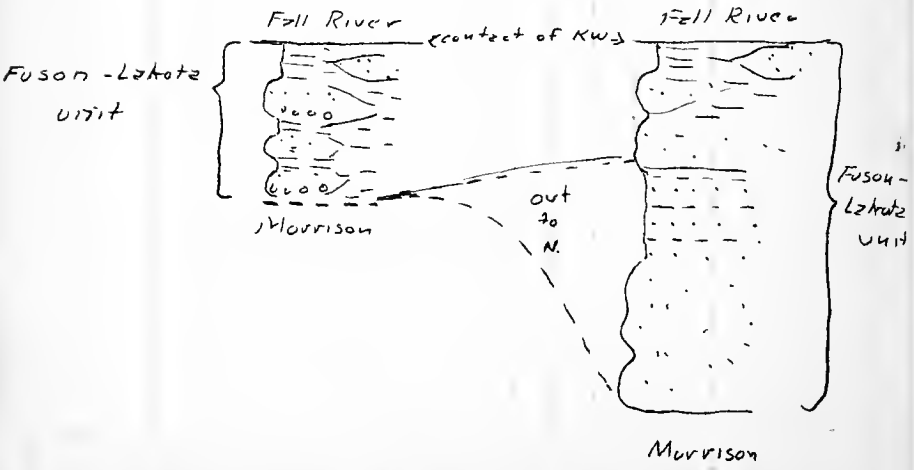
(Might be worth investigating whether these derived from ancestral Rockies - passed to Fountain correlatives - then in Jurassic uplifts to Morrison? and Lakota.) Doubt direct derivation. Crowleys thesis based on gold in Newcastle ss + Lakota coals is also subject to interps. other than one he favors of local derivation of Hills. Inyan Kara (+) from emergent Hills area near Keystone. Garland mentioned work by Russians on transport + redeposition of gold in solution.)

Approx succession, without regard to thickness, shown above for Garlands guard.

Possible relation to NW Hills.

Most similarities are in Fall River and upper part Fuson-Lakota, including contact between these units.

Most obvious differences – the southern Fuson-Lakota is markedly finer grained, ~~and~~ obviously much thicker and contains lacustrine beds. Good possibility that southern hills has more Lakota than northern. In D.T. area would guess we had relatively similar but coarser & thicker Fuson-Lakota interval = to southern "Fuson" and massive white upper Lakota, viz.



Possibly the coal-bearing Lakota

In the Aladdin — Sundance — Cambria areas are swamp or marginal lacustrine deposits which may mark local base levelling at about same time as southern lacustrine phase. All coals in question do come under the northern Lakota cgltc ss.

Miscellaneous notes.

At Devils Canyon on Cheyenne R. canyon walls spectacular Inyan Kara exposures showing the great local lateral variation typical of these rocks. Didn't get time for more than a look at this.

W-22 Wyo. Rt. 111 road cut across N. end Bear lodge Mts, chiefly in section 20, T. 54 N., R. 62 W.

Part A. Starting top big ss in first cuts W crest, + measuring down to break in cut at gulley.

[illegible]

o 53-? [illegible], massive. [illegible] cross-lam noted to cross-bedded, with local [illegible] lenses of [illegible] light [illegible]. A laterally [illegible] which is [illegible] studfrom [illegible] of ss in grey [illegible] laterally, in upper 15 20' [illegible] [illegible]

[illegible] with [illegible] 5' [illegible]

N 1.0-3.0 [illegible] fine gr., massive, [illegible] to [illegible] and [illegible] irreg. bedding in upper [illegible] ss

part, which weathers grayuhite with yellow staining. Locally upper slumping part is cut out by channel base overlying unit. About 2' from base is purple-pink zone in siltstone with black, Mn-looking spots and iron blobs. Below this zone which is 0.2± [illegible] color is gray + silt clayey. At base is 0.1-0.2 of hard Fe impreg. OB sandy siltstone which sticks out as thin ledge.

M 3.5 Siltstone, shaly, locally appears [illegible] shales. Brownish gray with purplish-red [illegible] grading to black. Locally [illegible] [illegible] [illegible] 1.0± [illegible] [illegible] [illegible] [illegible] [illegible]. Fe rich [illegible] spots [illegible] locally [illegible] reddish [illegible]. The [illegible] [illegible] detail [illegible] looks [illegible] [illegible] [illegible] [illegible] probably eroded up. Basal 0.2-0.3 are red [illegible] [illegible].)

L | 1.0-2.3 | Siltstone, more resistant than above; chiefly massive with rep. sand siltstone; x-lam. and laminae common with some mixed zone; as in above. Chiefly gray with upper 0.4 ± Fe impreg, red weath. which [illegible] whole unit purplish cast. Grades to unit below.

K | 4.8 | Siltstone and much silty (clayey) claystone [illegible] [illegible] black in middle part. Upper 1.5 ± [illegible] lighter [illegible] [illegible] siltier. Middle part unit is similar to 3.0 siltstone above, is clayey [illegible] siltstone [illegible] [illegible] [illegible] red [illegible] Fe [illegible].
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]
part [illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible] [illegible]
[illegible] [illegible]
black above. Base 0.1 or less, is red Fe impreg zone on Ss below.

J 2.7

I 24.4

12.

concretionary ledge. Weathers 1B to buff.

This outcrop of this interval broken by gulch but tie across is within about 2 or 3 feet at most, short if anything.

(Part B.)

H	3.3	Siltstone, sandy, to shaly gray with irreg black blebs + specks — upper 1.5 feet gray with Fe red stain in irreg blotches. Locally this is a fine gr. silty SS in upper part or a silty shale 1B with siltst.
G	0.6	Sandstone, fine gr., silty to clayey gray, massive, grades to unit below.
F	1.4	Siltstone, loc sandy + clayey gray to light green gray with red mottling (Fe st.) + stain
E	1.4	Sand, silty at top, very light grey with greenish cast and pink to red. Cut of Fe impreg OB silt at top and 0.1(-) of red Fe impreg fine gr lam

SS, 0.4 from base. Shale is silt free thruout all but [illegible] base

D 0.6 Sandstone, fine gr, Fe impreg, resistant, forms local ledge upper 0.1 ± forms Fe cap weathers OB with red tops

C 2.5 [illegible] loc. shaley, grey, soft, mottled pink + with some Mn blebs also ≅ carb

B 0.8 Siltstone, sandy, [illegible] hard, forms loc. ledge, [illegible] Fe impreg.

A 5.0 - ? Clay [illegible] silty v.v. red and grey with Fe specks thruout 3.2 from top red gets brick - or [illegible] red, in areas Fe concentration like red ochre.

Reza [illegible]

On the east side of the hill the road cuts show channel sands in lower thin-bedded portion of the Fall River. The contact is in similar beds to those on west side with a variegated zone with white, yellow mottled siltst with plant frags resting on the highly colored (here orange rather than red) zone with Fe specs.

Cut on E side of hill = one with thick orange-colored slope on E side.

Measuring down from equivalent to unit B of preceding section

Part C

-?- Sandy pink & gray

0.4 to 0.8 (= Unit B) Siltstone, light gray, mottled with yellow stain, locally laminated, has carb fragments — and loc. fern pinnules.

3.0 Siltstone, light gray, massive, shot through with yellow Fe. specks. Loc. clayey, upper 2/3 has yellow stain then, about 2' from top bright orange in irreg areas. Grades in lower foot to unit below

2.3	Claystone, silty, gradational from clayey siltst. above. Gray with Fe dots, finely silty, largely colored by bright orange stain. The Fe specs near base are not yellow or red seem to be unweathered, are brownish gray grain-shapes (Sample 1 in part)
3.4	Siltstone, clayey, gray with the scattered "grains" of Fe, some orange stain (Sample 1 in part) Sift
5.0	As above but [illegible], becoming sandy locally, [illegible] Fe specks
4.7	As above, but sandy throughout, and lacks Fe specks. Gray, some yellow stain
[illegible]	Sandstone, med gr at top grading to fine gr & silty below. ~~[illegible]~~ [illegible] top gray below.

Next cut downhill has [illegible] upper part but no continuous bed [illegible] between cuts. The preceding section does not even hold for the cut inasmuch as the sand at the base lenses out ~~to~~ toward the east end of the cut and other sandstones come in well up in the section [illegible] zone.

In next cut down, silty ss with carb frags is at top, and similar to ss with carb frags in E end gutter at lowest point preceding cut, not below where [illegible] steps. This ss (in [illegible]) is about 7 to 8' thick — [illegible]

Pt C (cont.) Grass rock [illegible] = upper 3'± of cut, then trench begins — approx section covering along cut with level.

[illegible] coarse [illegible] has lenses of gray silty ss., carb frags in large & small chunks which appear water worn. Basal [illegible] is coarse [illegible] Fe impreg.

5.0 ± Claystone, gray, silty in upper ½ foot grading abruptly to gray sandy siltstone and on into SS. Lower 1.3± yellow weath. med gr. SS.

11.0 ± Chiefly SS with interbeds of clayey ~~silty~~ gray sandy siltstone. SS weaths O to yellowish. Is fine to med. lenticular.

1.0 – ? Dk gray to black plastic claystone ?

[illegible] a gully [illegible] has dk green clay [illegible], but [illegible]-like lite gray clay [illegible] base — this cannot be hooked up with last cut.

W-23 Weehinkle divide section, Missouri Buttes quad., cent. SE¼ SW¼ sec. 28, T 53 N, R. 66 W. Local small bluff on W side gulch trib. to Left Hand drainage

Starts in lower sandstone of Fall River and goes downward with only local offsets on trenches to massive coarse cglte Lakota.

Grass roots

8.0 Sandstone, thin-bedded, [illegible] fine-grained [illegible] to yellowish gray. Some silty partings lower feet. [illegible] ft, [illegible], upper [illegible] with [illegible] Fe [illegible]

1.4 Interbedded siltstone, silty [illegible] and fine-grained [illegible] [illegible] Wet [illegible]

0.9 Siltstone with [illegible] silty [illegible]ated black clay [illegible] siltstone and [illegible] [illegible]

[illegible]

2.5 Siltstone, greenish [illegible] to silty clay [illegible] light gray with yellow stains. [illegible] is very yellow, [illegible] [illegible]

5.3 Claystone, plastic, variegated, red, purple, light gray.

5.3 Claystone, light gray, selenitic, silty in part 0.8, lowest 0.5 orange stained.

4.0 Siltstone, locally sandy, clayey. Upper 0.8 fairly hard but friable, remainder is soft, locally selenitic throughout, white at top to light gray then light gray in basal part.

5.7 Claystone, silty light gray, with thin lenses siltstone and fine sandstone SS - 0.5, at base, Siltst - 0.5 thick at 9 - 7.1 above base, and a sandy siltstone 1.5 thick from top. Upper foot is claystone and silty with some selenite.

1.2 Claystone, light gray, sticky to selenitic, fairly silty

thinly silty, with 0.1 layer of grey flint clay at base.

14.0 Sandstone [illegible], yellow, fine to coarse grained, some scattered granules cht + qtz in [illegible]. Friable, weathers pinkish brown, [illegible] X-bedded surfaces.

11.7 Sandstone, chiefly med. gr., unconsolidated, continuous with above. Has sparse scattered cht + qtzite granules + small pebbles.

2.1 Sandstone, large form of fine + med. gr., [illegible] [illegible] [illegible] [illegible]. Remainder [illegible] [illegible] [illegible] interval above.

19.6 Sandstone unconsolidated [illegible] [illegible] [illegible], some interbedded [illegible] 5 [illegible] [illegible] above [illegible], lower 3' [illegible] [illegible] [illegible], basal 0.4 Fe stained [illegible]

3.4 Clay[illegible], dark gray to black scattered qtz & chl [illegible] granules, & is sandy, basal 0.6± is conglom. sandy [illegible]. Granules [illegible] toward base.

4.0 [illegible] sandy, light gray, shaly at base, sparsely scattered granules in lower [illegible].

1.[illegible] Clay[illegible] [illegible] gray, grading to gray ss. of [illegible] & yellow, [illegible] granules, scattered.

1.2 [illegible], gray, calc., lower 0.8 is [illegible] [illegible], [illegible] [illegible] small [illegible].

[illegible] [illegible] [illegible], [illegible] [illegible] calcic. [illegible] [illegible] part 0.5± then white, yellow [illegible] with [illegible] for 0.5, then [illegible] [illegible] [illegible] base [illegible].

chert vqtzite grvl. Basal
1.8 unconsol. clst pebble gravel

1.5 [illegible] grading to fine-gr white ss, few coarse grains and scattered granules.

0.6 Siltstone, gray grading to fine grained calcareous ss. Few coarse sand grains.

1.7 [illegible]

3.4 Clayey Siltstone + silty [illegible]

5 [illegible] fine to coarse grained, friable, [illegible]

but locally sharp [illegible] contact
[illegible]

+ cglte SS
8.5-? Conglomerates with larger [illegible] to coarse + cglte. SS. Chiefly gray and black [illegible] [illegible] [illegible] or [illegible] to granule [illegible]. ledges [illegible]

[illegible] (prob. base cgl on slope is [illegible])

to north
[illegible], down gully, [illegible] lateral change [illegible] [illegible] [illegible] [illegible] [illegible] cglt. ledge gets thicker. [illegible] top [illegible] [illegible] [illegible] [illegible] [illegible]

[illegible] 30 ft N a 30-foot ledge of cglt lens [illegible] in SS.

W-24

Breach of Pine Ridge - Oil Butte anticline N. side Keyhole reservoir, in & to W. of gulley running E thru. about center SW¼ sec 20, T.51 N., R 66 W, Carlile quad.

At crest of ledge approx topo measurement at here [illegible]' of ss. shows .75' ledge to grass roots below, and 17' platy weath ss above ledge. All of which is Lakota. Here massive ledge base not far above greengray Morrison.

Along ridge N of crest ledge broken up by lensing out of some of SS channels into softer beds.

In gulley, handleveling up slope along strike (N14W 22E) it is 16'± from top Lakota [illegible] [illegible] to the contact, and 10.5 ft from contact into lower FR ss, which only crops out in part locally.

The contact is sharp.

1.0-? Black silty shale, lb siltst

0.2± Siltstone, grey, x-lam, carb frags

0.4 Claystone light grey, weathers white

0.2 Ferruginous clstn rusty, full of Fe specs.

1.3 Claystone, laced [illegible] grey with yellowish cast Fe specks [illegible] [illegible] [illegible]

0.3± Ferruginous clstn, [illegible] Fe specks

1.0±? Claystone, [illegible] [illegible] light grey and purple, Fe specs in upper lot ([illegible]) give yellow stain

W-25 L[illegible] [illegible], Missouri [illegible] [illegible]
Bluff north road in center S½ NE¼ Sec. 18, T53N, R66W.
(Morrison - Lakota contact + base Morrison here)
Blue [illegible] locally by Fe indurated remnants ~~[illegible]~~ blk + grey chert pebble cgl. [illegible] this is ±22 feet of [illegible] [illegible] [illegible], x [illegible] to [illegible] [illegible] [illegible] which is [illegible] [illegible] at top. Some of [illegible] [illegible] [illegible] [illegible]

[redacted]

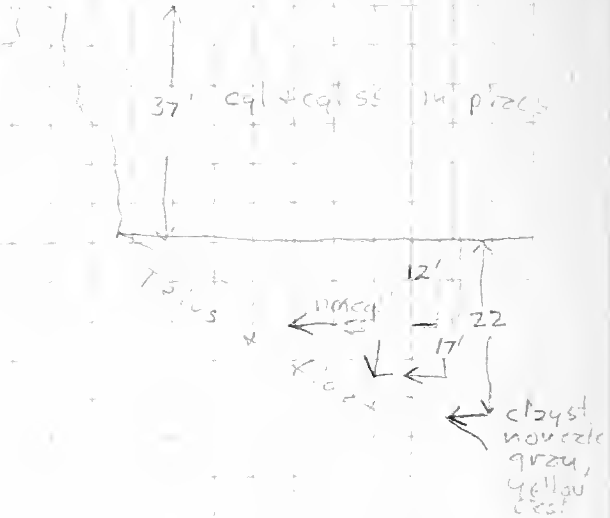
is between NW + N. in direction of flow.

Below [illegible] SS [illegible] [illegible] bent [illegible] slump blocks, from under which float indicating [illegible] of lignitic beds. May be possible to dig out [illegible] [illegible] [illegible] slump blocks but need heavier equipment. Morrison well exposed, some trenching with minor gaps could take it to base as yellow SS present

W-23 Part C — Wash [illegible] [illegible] [illegible] [illegible]. [illegible] [illegible] [illegible] to get bottom but no [illegible] at C, [illegible] is 37 ft thick to its talus slope. Just on SE of point is unusual vertical structure with concave bedding. Taken to be a pot hole filling. It is 12-15 feet vertically and up to 2.5 in. diam, [illegible] [illegible].

Base of Lakota in question,

set up as follows

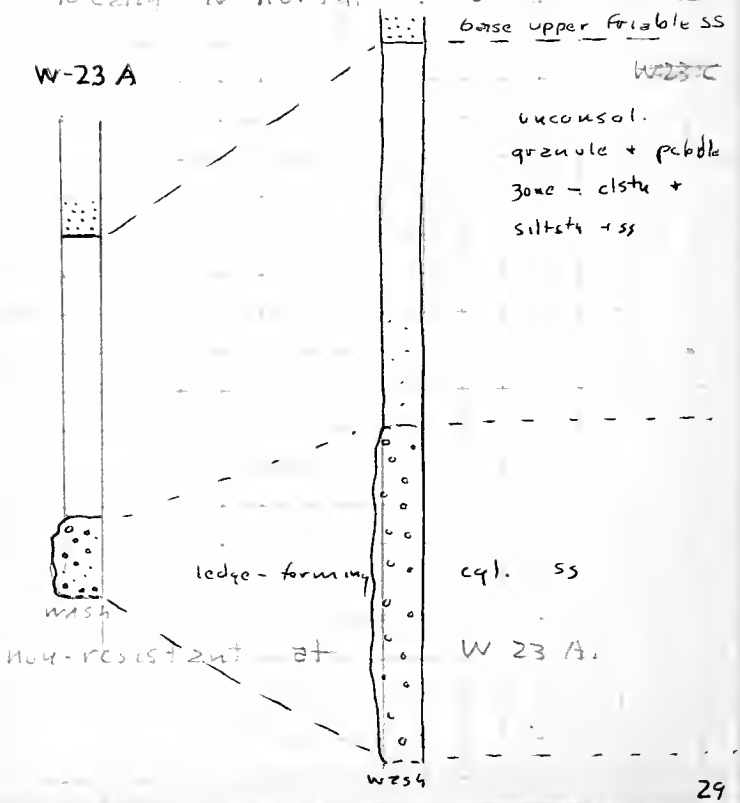


To south up [illegible] toward where we measured section is prospect pit under cgl ledge. Shows about 2' claystone, Upper foot dk brownish gray lower [illegible] light gray.

This is under a slump block, from top clstn to top of ledge in place is 44 ft, so that would bring Lakota-like clstn in at 44', as [illegible] on diagram above.

W-23 B Just N. W-23 A, on base slope with gravel wash is cap ss which is the base of the 19.6 unit (see p. 21) in Wechinkle section. From here down to base of the cglte ledge it is approx 75' stratigraphically by hand level measurement.

Approx N-S section would show that basal cgl is thickening locally to north.



W-3A. Government Canyon area, bluffs along W side of road connecting with Seely-Algade road in ~~the~~ sec. 18, T. 56 N., R. 64 W. The locality is probably in sec. 31, T. 57 N., R. 64 W., according to Crook Co. road map.

Along the bluff a channel sandstone forms massive ledge for distance of about 300', lensing out into silty to sandy claystones laterally. Ledge is in Lakota, at about same position (15-20 feet) below Fall River contact as the friable ss lens in the Gov't Canyon section.

From sandy clstns, a clstn assoc with the ledge, numerous polished pebbles washing out. Fusulines + other fossils in some of these. Sent to P+S for possible ident. of source. Also included part of stromatoporoid?

Theobalds Fossil Forest on Inyan Kara creek.
Silicified fossil logs coming out of beds which may be either lower Lakota or Morrison. Paul Theobald has section here.

specimen of best structural preservation submitted to P & S branch. This is a critical section if stuff ~~in~~ is undoubted early Cretaceous, can probably be tied in with Inyan Kara #2. Think that a detailed mapping of bluffs E of creek between I.K. #1 and this locality might reveal whether Morrison & Lakota transitional, interfinger laterally, or have an identifiable plane of separation when both are in claystone phase.

Location of fossil wood —

Core samples from A.E.C. Drilling

1. Hulett Creek

Hole - H.C. 154, box 5
Contact at 133.5 ± is dark gray shaly siltstone with carb frags on a gray white siltstone & sandy siltstone with Fe specs.

Sample 133 - 136

A - 133-133.4,
B. contact piece
C. 133.? to 135
D 135 to 136
E. 136 to 137

2. Poison Creek #3

Contact at 169 ± break between gray [illegible] and a soft light gray claystone

A - 165.7 - 169 [illegible] & [illegible]
B - 169 - 170 claystone with Fe blebs.
C - 170 - 172 ±
D - 172 - 173 ±

[illegible], from 175 down, gra. back to Sandstone with [illegible] rocks [illegible] to the Fall River

3. Elkhorn Creek #3

Contact at 149.7 ± is carb silt on light gray clay.

A. 149 to 149.7±

B 149.7 to 150.7

C 150.7 to 152.7

In Elkhorn #4 the Fall River basal contact at 146.2, the Morrison upper contact at 385. No coal [illegible] basal FR is silts on gray clay with Fe [illegible]

(spot sample #A is 146.2 to 146.7

4. Dinky Creek NHR 126

[illegible] at [illegible] 135 ([illegible] [illegible]

A. 0.4 above contact.

B. contact to 1 foot below

C. Spot sample [illegible] below [illegible] [illegible]

5. Bronco John Creek

Contact [illegible], log [illegible] [illegible]

190 – 190.7 Shaly lignite

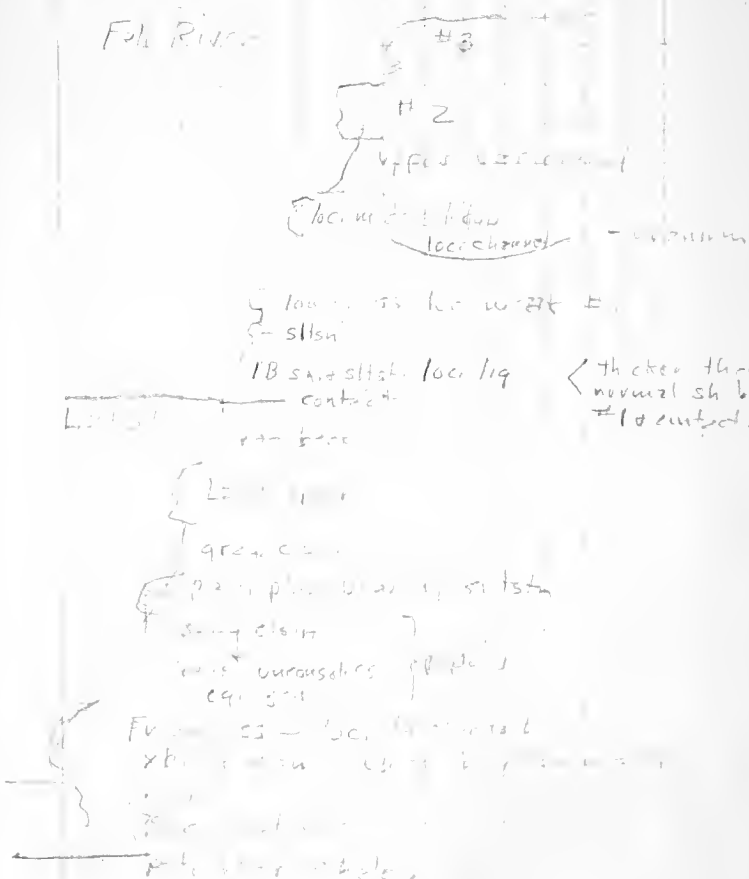
190.7 - 196 [illegible], dk gray [illegible] [illegible] [illegible] [illegible] [illegible] [illegible] in upper .4 [illegible]

is dk grey. lower part light grey [illegible] clayey, [illegible] [illegible].

196 – 198.4	Light grey clayey, silts [illegible] continuous [illegible] Fe spe[illegible] begin about 0.2 from top. [illegible] sandy. Some pyrite [illegible].
198.4 – 202.5	Claystone, silty, [illegible]. Fe spe[illegible] [illegible] light grey, except in the [illegible] 1.54 [illegible] grey [illegible]
202.5 – 206	Claystone, very [illegible], grey with [illegible] [illegible]
206 – 211	Silts[illegible] [illegible] very [illegible] [illegible]
[illegible] 212 [illegible]	

W-26 Storm Hill Quad. with Glenn & Rdn

E. end Storm Hill.



A824

W-27 Skull Creek fossil locality on Elkhorn Creek.

In ferruginous conc. layer just E. of road at fork just N of cent. sec. 23, T 56 N, R. 6E W. Layer is just under a p[illegible] sand zone which sl[illegible]. surf. pl[illegible] a bit [illegible]

W-28 Locality in first bentonite pit N of Bentonite Rd west intersection with Atzadie Rd about 1¼ miles

Newcastle bentonite

Top of cut

I	3.0±	Wash on weathered outcrop of black shale & bentonite
H	1.0	Silty black shale grading to a shaly siltstone locally
G	0.3	Black shale
F	0.35	Bentonite
E	1.3	Black shale [illegible] sandy at base with some sandy lig. sh. in [illegible] 0.2
D	4.2	Sandstone, fine gr. silty [illegible] contains x-lam. on small scale [illegible] ripple marks?)
C	2.5±	Shale black grading dk gray at top grading to mottled gray and light gray bentonitic shale.

B — 4.0± Bentonite, green-grey, grades into bentonite shale above.

A — 0.5–? Lignite, shale, wood frags. (wood samples.)

Bottom of pit

W-29 Bed [illegible] in Newcastle.

Grass roots.

7.7 Siltstone, laminated, light grey, [illegible] fine sand locally, 1 ft from top — brown conc. Fe in sandy part (0.8±); weathers [illegible] 5' from top±. In [illegible] the silt [illegible] progressively more clean & darker grades into hard siltn. clstn. than into unit below. About basal 2' massive [illegible] laminated).

Top of upper conc. zone weathers locally to strong brown sandstone.

0.3 Shale, black, tough, weathers

fissile. Is silty & locally replaced by shaly siltstone

3.3 Bentonite.

0.5-0.8 Lignite & lig sh., some pyrite chunks fossil wood loc.

1.0 Claystone, grey, finely silty plant rootlets, vertical

1.3 Shale, silty, loc. lignitic & shly lig siltst. rootlets remains on bedding

0.8 Claystone grey-dk grey, carb. fragments, selenite

2.8 Claystone, light grey, silty grading to Siltstone, rootlets (vert), in most of it ~~mottled~~ white, massive

0.7 Sandstone, fine gr, silty, loc. calc cement causes brown weath crumbly lenses. Loc nodules with barite cement? Cont. with beds above & below

3.2 Siltstone, massive light

gray, with Fe specs, which locally weath yellow, giving mottled splotchy stain. Is locally clayey (Sample #1)

2.1 Siltstone, gray to dk gray, thin bedded, upper 0.7 with tan terms obscure shaly loc. Grades to silty shale; and dark gray shale in lower 0.5, which grades thru bentonitic zone to unit below,

1.3 Bentonite.

1.3 Lignitic silty clstn seams lignite

5.5 Claystone, liad, gray to dk gray & brownish gray. Darker shades in upper 3.0 where earth forms plentiful, chunky root clsts. This zone may be fair ref. clay, but finely silty.
Lower 2.5 is light gray silty clstn with local concents of Fe blebs which weath out in irreg brown Fe clusters or nodules (Sample 2)→

[redacted]

stem crop yellow in sp[illegible]

3.0 Continuous with above —
Irreg interbedded + interlam
siltstone + claystone with
grey to brown [illegible]
seams. [illegible] clay.
Chiefly brownish [illegible]
in lower part. Some of
clay [illegible] lam. Local [illegible] ~~[illegible]~~ lenses

2.0± Sandstone + [illegible] [illegible] poorly
indurated, brownish [illegible] fresh
with carb. frags, weathers
white to yellowish, [illegible]
and spongy. Gets [illegible] in
basal 0.5 — locally lignitic [illegible]

0.8 [illegible]
greenish gray

Skull Cr. Sh.— ? Shale, clay, dk grey to
black, 1.7 [illegible] top
is 0.5 zone with
glauconite. (Sample 3)